

EHP-50D **Electric and Magnetic Field Analyzer**

- ◆ **State of the Art Technology with Simultaneous Three-Axis Acquisition**
- ◆ **Low Frequency Electric and Magnetic Field Analysis up to 100 kHz**
- ◆ **Isotropic Measurement with Total Dynamic Range up to 150 dB**
- ◆ **Small Size and Optical Fiber Connection for Spot Measurements**
- ◆ **Built-in FFT Spectrum Analysis**
- ◆ **Wideband Mode**
- ◆ **Built-in Li-ion Rechargeable Battery with Long Operating Life**
- ◆ **Interface to NBM-550 Field Meter and PC**
- ◆ **Stand-Alone Operating Mode with Internal Data Logger**



Low Frequency Electromagnetic Fields

Electrosmog is a term commonly used to describe any phenomenon or problem associated with artificially generated electric or magnetic fields. A range of electric or electronic devices may cause an environmental risk and - under certain conditions - generate potentially hazardous electric or magnetic fields. However, special attention is focused on low frequency fields such as those generated by power transmission lines, railroads, and high current equipment in general (large electric motors, industrial-scale manufacturing plant, power generators, etc.). These low frequency fields are basically characterised by high electric and magnetic field component values in the near field region, although these values decrease rapidly over distance. The risk of exposure to potentially harmful low frequency fields may be present elsewhere (e.g. offices near large machinery, homes close to a high voltage power line, etc.). As several studies around the world have confirmed the potential risks from irradiation with strong low frequency electric or magnetic fields, electrosmog and its possible consequences are under close consideration by IEC, CENELEC, ICNIRP and many other national organisations. New standards are being prepared and all reasonable protection measures are being taken to preserve the health of workers and citizens all over the world.



EHP-50D Electric Field and Magnetic Flux Density Analyzer

EHP-50D

ELECTRIC AND MAGNETIC ISOTROPIC FIELD ANALYZER



The EHP-50D is not simply an upgrade of the EHP-50C, but represents a real leap in technology made possible by the availability of even more sophisticated components that can provide high level performance while keeping the physical dimensions and intrinsic noise level small.

The EHP-50D gives users the choice of three measurement modes: Wideband, which measures the contribution of all the frequency components in the selected frequency span; Highest, which measures only the highest level found within the span; and Spectrum, which includes marker functions. The spectrum analysis feature means that the EHP-50D can be used to measure only the field contribution from the selected source, such as a high voltage line, excluding other nearby interfering frequencies. Everything is contained in the small (approx. 1 dm³), cubic EHP-50D housing: three magnetic coils and three plate capacitors orthogonally positioned for sensing the fields; a multi-channel analog to digital converter followed by a powerful DSP (digital signal processor) for analyzing the signal; the CPU module that controls all the functions; an E2PROM that stores the calibration data and the frequency and level calibration tables; an optical interface to allow easy connection to external displays via optical fiber link; a high capacity data logger for stand alone continuous acquisition; and the control panel with the connections and the ON/OFF switch.

APPLICATION FOCUS: SIMULTANEOUS THREE-AXIS MEASUREMENT

The EHP product family is a unique solution providing both E and H field measurement, including spectrum analysis, in a single, small size casing. Thanks to its multi-channel A/D converter, the EHP-50D additionally provides simultaneous

three-axis acquisition for unsurpassed performance even in the most complex applications. Specialists in the low frequency field who were mainly performing measurements to assess the exposure of the public to the relatively steady fields emitted by power lines are now facing new challenges to provide answers regarding field exposure in the workplace. According to various standards and regulations as well as to the European directive, which will be effective from April 2012, work environments must be assessed in order to ensure that the maximum permitted field levels recommended in the ICNIRP guidelines are never exceeded. The industrial environment not only encompasses devices generating relatively steady fields, but also includes welding machines and other devices generating very complex or pulsed fields. Simultaneous three-axis measurement is therefore mandatory for these applications, which consulting companies, industrial health and safety departments, and workplace health and safety agencies will be asked to perform more and more in future.

EHP-50D Operation

The EHP-50D adopts the same extremely flexible operating concept found in preceding models, such as "Stand Alone" mode, remote control by PC via an optical connection, and remote E and H field sensor for portable field meter. The EHP-50D as well as its different operating modes therefore appears to be the same as the EHP-50C but it has a completely new "heart" beating within it to give the highest level of performance even in the most complex situations. The EHP-50D was designed to provide all the performance, capacity and functions needed, and is shown as the best tool for measuring low frequency electric and magnetic fields and displaying, recording and analyzing their values on the NBM-550 field meter or a PC screen. The PC program allows for remote control by optical fiber as well as for setting the probe and downloading measurement results acquired in "Stand Alone" mode or stored in the NBM-550 memory. The EHP-50D provides an advanced solution for field measurements in the 5 Hz to 100 kHz range, with an unsurpassed total dynamic range of up to 150 dB and a built-in spectrum analyzer function.

EHP-50D OPERATING MODES

- Stand-Alone Operating Mode
- NBM-550 Display Operation
- EHP-TS Remote Controlled Operation



EHP-50D Electric Field and Magnetic Flux Density Analyzer

Stand-Alone Operating Mode

CONTINUOUS ACQUISITION WITH INTERNAL DATA LOGGER FOR UP TO 24 HOURS

When long-term monitoring is essential, such as when measuring magnetic fields close to high, medium and low voltage transformers, close to power lines or to machinery, air conditioning systems, large home appliances, and so on, the EHP-50D can be used in stand-alone mode without needing to be connected to a PC or a NBM-550 meter. Once the measurement parameters have been programmed using the PC software (supplied), the EHP-50D analyzer can start acquisition and storage of the data in stand-alone mode for a period of 24 hours at a sampling rate of once every 30 or 60 seconds. The EHP-50D will stop automatically after 24 hours. EHP-TS control software includes the application "EHP50 - Stand Alone mode". The data can then be downloaded to the PC. The PC software enables you to select measurement (electric or magnetic field), full scale, mode (Highest or Wideband), frequency span, and sampling interval (one minute or 30 seconds).

NBM-550 Display Operation

Handheld display unit for field measurements. The EHP-50D can also be easily operated through the Broadband Field Meter NBM-550. In order not to influence the field to be measured, communication between the EHP-50D Analyzer and

the NBM Unit is through a rugged optical fiber cable. The NBM-550 supports the following settings and measurement modes:

- Electric or magnetic field selection (1 kV/m; 100 kV/m; 100 μ T; 10 mT)
- Span selection (100 Hz to 100 kHz)
- Wideband or highest peak modes
- Spectrum mode
- Monitor mode (Actual; Max; Avg; Min)
- XYZ mode (wideband or highest peak)

Additional features include:

- Measurement setups
- Normalized spectrum in % relative to a standard (e.g. ICNIRP)
- Alarm with adjustable thresholds for electric and magnetic field
- Averaging (4 to 32 samples) and Maximum Hold
- Unit selector for Tesla / Gauss
- Full resolution spectrum marker
- Data storage on NBM-550 including spectrum data Narda Broadband Field Meter NBM-550 with EHP-50 D
- Timer Logging
- Post-averaging for logged data on PC (RMS, Mean, Median)
- Powerful PC software NBM-TS for evaluation and documentation
- GPS receiver (optional)
- Operating languages: Chinese, English, French, German, Italian, Russian, Spanish, Turkish

For more information please refer to the NBM-550 product information on the Narda website.

NBM-TS APPLICATION SOFTWARE

The NBM-TS application software, which is included with the Narda Broadband Field Meter NBM-550, provides functions for transferring the results that have been stored in the meter memory to a personal computer. It also includes data evaluation and measurement database management functions.

All the numerical value and spectrum analysis results stored in the meter can therefore be transferred to the user's PC for further evaluation and analysis, stored in the database, and used to prepare detailed reports.



Narda Broadband Field Meter NBM-550 with EHP-50 D



EHP-TS Remote Controlled Operation^a

DISPLAYING ELECTRIC AND MAGNETIC FIELD VALUES IN A SPECTRUM ANALYSIS GRAPH

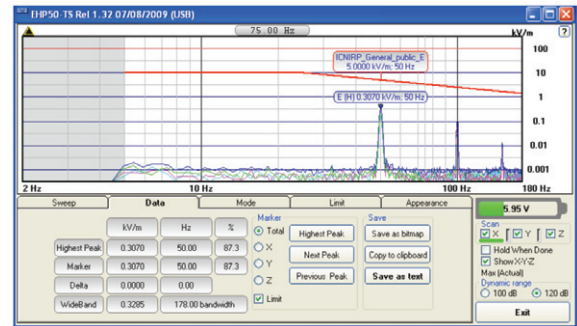
The EHP-TS control software allows the user to control Narda analyzers such as the EHP-50C/D and EHP-200/A from a PC. The limit value can be shown at the Marker frequency. The Data tab shows numerical results and includes Marker controls and Save buttons. The optical cable coming from the analyzer (max. length: 40 m) is easily connected to the PC using the optical to USB converter (USB-OC) provided. If a longer distance is required, the optional 8053-OC optical to RS232 converter can be used for optical fiber lengths of up to 80m.

A user-friendly graphical interface includes the commands for setting all the parameters. To make them easier to understand, the controls are grouped on five selectable tabs. The spectrum measurement is continuously displayed and updated. Both electric and magnetic field spectrum measurements can be displayed on the same graph.

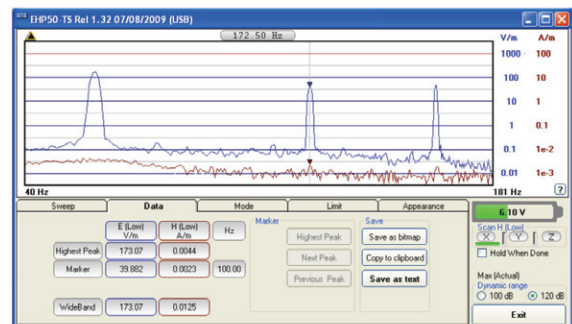
The Sweep, Mode, Limit and Appearance tabs are used to set all the measurement and display parameters, while the Data tab with the Marker controls shows numerical results like the field strength and frequency at the marker and highest peak positions. A wideband measurement is also displayed, which includes all the field contributions within the spectrum shown. Several different units, including percentage of limit value, can be selected for displaying the measurement results, which can be saved along with user comments either as bitmap or as text files so that they can easily be imported into other software applications such as spreadsheets or word processors.

Following the so-called precautionary principle, many countries have adopted their own reference limits. Besides having the ICNIRP limits already included, EHP-TS also allows the user to create and save customized limits that may reflect local regulations as well as user-specific requirements. All the values of the selected limit are always included for reference in any .bmp or .txt file saved. The availability of lightweight devices equipped with the Windows operating system, such as UMPC and similar devices, makes EHP-TS software the ideal solution for performing accurate in-field spectrum analysis with the minimum of effort using lightweight equipment.

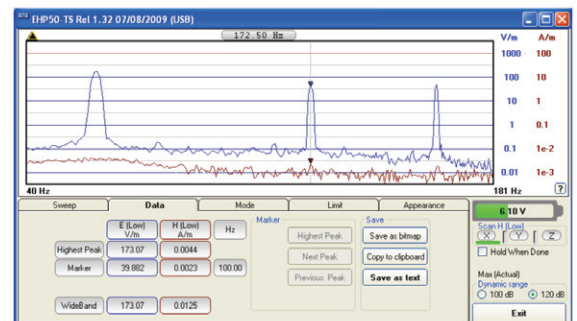
^a Earlier versions of the EHP50 analyzer (EHP-50, EHP-50A, EHP-50B) must be hardware updated to EHP-50C to operate in conjunction with EHP-TS control software. For information contact your Narda distributor.



The limit value can be shown at the Marker frequency. The Data tab shows numerical results and includes Marker controls and Save buttons.



The spectrum can be shown as a percentage of the selected limit. The Mode tab allows selection of different acquisition modes as well as the range, units and linear or logarithmic frequency scale.



Both electric and magnetic fields can be displayed on the same graph.



Electric and Magnetic Field Measurement

EHP-50D Electric Field and Magnetic Flux Density Analyzer

Specifications

EHP-50D		
FUNCTIONAL SPECIFICATIONS ^a	Electric Field	Magnetic Field
Frequency Range	5 Hz to 100 kHz	
Measuring Ranges ^b	5 mV/m to 1 kV/m 500 mV/m to 100 kV/m (total measurement range: 146 dB)	0.3 nT to 100 μT 30 nT to 10 mT (total measurement range: 150 dB)
Overload	200 kV/m @ 60 Hz	20 mT @ 60 Hz
Dynamic Range	106 dB	110 dB
Resolution ^c	1 mV/m with NBM-550 0.1 mV/m with EHP-TS software 1 mV/m in Stand Alone mode	0.1 nT with NBM-550 0.1 nT with EHP-TS software 1 nT in Stand Alone mode
Displayed Average Noise Level ^d Isotropic Result Single Axis	5 mV/m 3 mV/m	0.3 nT 0.2 nT
Flatness (@ 100V/m and 2μT) 5 Hz to 40 Hz 40 Hz to 100 kHz)	0.8 dB 0.35 dB	0.8 dB 0.35 dB
Typical 3D anisotropy ^e	0.54 dB	0.12 dB
Linearity ^f	±0.2 dB (1 V/m to 1 kV/m)	±0.2 dB (200 nT to 10 mT)
SPAN	100 Hz, 200 Hz, 500 Hz, 1 kHz, 2 kHz, 10 kHz, 100 kHz (500 Hz to 100 kHz in Stand Alone mode)	
Starting Frequency	1.2 % of the SPAN	
Stop Frequency	Equal to the SPAN	
E-Field Rejection	—	> 20 dB
H-Field Rejection	> 20 dB	—
Spectrum Analysis Method	FFT	
Acquisition Method	Simultaneous three-axis acquisition	
Internal Data Logger	1 measurement every 30 or 60 seconds	
Internal Memory ^g	Up to 24 hours regardless of the logging rate	
NOTES:		
^a Unless otherwise indicated, specifications are referred to an ambient operating temperature of 23°C and relative humidity of 50%		
^b For each individual axis. Ranges to be selected manually		
^c For the lower measurement range		
^d DANL is frequency and SPAN dependent. The specified best performance is referred to f ≥ 50Hz and SPAN ≤ 1kHz		
^e Typical value @ 50Hz, see application note "BG_0509_ELF_measurements_uncertainty" for details		
^f Referred to 100 V/m and 1 μT @ 50 Hz		
^g Measurement results acquired in stand alone mode can be transferred to PC only		
GENERAL SPECIFICATIONS	Electric Field	Magnetic Field
Calibration	Internal EEPROM	
Temperature Error @ 55 Hz referred to 23°C @ 50% of relative humidity (when applicable)	-4x10 ⁻³ dB/°C between -20 and +55 °C	-8 x10 ⁻³ dB/°C between -20 and +23 °C +13 x10 ⁻³ dB/°C between 23 and 55 °C
Humidity Error @ 55 Hz referred to 50% (@ 23 °C)	+11 x 10 ⁻³ dB/% between 10 and 50% +22 x 10 ⁻³ dB/% between 50 and 90%	-7 x 10 ⁻³ dB/% between 10 and 50% +10 x 10 ⁻³ dB/% between 50 and 90%
Internal Battery	3.7 V / 5.4 Ah Li-I , rechargeable	
Operating Time	>9 hours in standard mode 24 hours in stand alone mode	
Recharging Time	< 6 hours	



EHP-50D Electric Field and Magnetic Flux Density Analyzer

GENERAL SPECIFICATIONS (continued)	
External DC Supply	10 to 15 VDC, I = approx. 500 mA
Optical Fiber Connection	Up to 40 m (USB-OC) Up to 80 m (8053-OC)
Firmware Update	Via the USB or RS232 optical link
Self Test	Automatic at Power On
Operating Temperature	20 to +55 °C
Operating Relative Humidity	0 to 95 % (without condensation)
Charging Temperature	0 to +40°C
Storage Temperature	-30 to +75°C
Tripod Support	Threaded insert ¼"
Dimensions	92 x 92 x 109 mm
Weight	550 g
Recommended Calibration Interval	24 months

Ordering Information

EHP-50D	Ordering Number
<p>EHP-50D Electric and Magnetic Field Analyzer Set, 5Hz-100kHz, for NBM-550 Includes:</p> <ul style="list-style-type: none"> - EHP-50D Basic Unit (2404/01) - AC/DC Battery Charger (2259/92.08) it includes international AC plugs adapters (Europlug CEE 7/16, UK, USA, Australia) - FO-10USB Optical Fiber Cable, 10m for Opt-USB Converter (2260/91.11) - O/E Converter USB, RP-02/USB (2260/90.07) - Optical Bridge Connector (2260/91.10) - Tripod Extension, 0.50m, non-conductive (2244/90.45) - EHP-TS PC Software, CD-ROM including user manual (2404/93.01) - Foam Inserts for fitting EHP-50D into the NBM-550 hard case (2404/90.01) - Calibration Certificate 	2404/101
<p>EHP-50D Electric and Magnetic Field Analyzer Set, 5Hz-100kHz, for Stand-alone and PC use Includes:</p> <ul style="list-style-type: none"> - EHP-50D Basic Unit (2404/01) - AC/DC Battery Charger (2259/92.08) it includes international AC plugs adapters (Europlug CEE 7/16, UK, USA, Australia) - FO-10USB Optical Fiber Cable, 10m for Opt-USB Converter (2260/91.11) - O/E Converter USB, RP-02/USB (2260/90.07) - Optical Bridge Connector (2260/91.10) - Tripod Extension, 0.50m, non-conductive (2244/90.45) - Mini Tripod, bench top (650.000.151) - EHP-TS PC Software, CD-ROM including user manual (2404/93.01) - Soft Carrying Case (650.000.035) - User Manual - Calibration Certificate 	EHP-50D
ACCESSORIES	
FO-20 USB Cable, fiber optic 20m	650.000.178
FO-40 USB Cable, fiber optic 40m	650.000.182
FO-8053/80 Cable, fiber optic 80m	650.000.128
8053-OC Optical to RS232 Converter	650.000.062
8053-OC-PS Power Supply	650.000.179
TR-02A Wooden Tripod 1-2m with soft carrying bag	655.000.005
TT-01 Telescopic Mast (120-420 cm) with carrying bag	650.000.005
Soft Carrying Case	650.000.035
Rigid Case	650.000.059
Car Adapter	650.000.058